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**UNIVERSITY STUDENTS' RISKY BEHAVIOR IN ONLINE
ENVIRONMENT DURING THE COVID-19 PANDEMIC**

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Abstract

Digitalization and the transition to an online environment has increasingly affected all areas of human life including the field of education. With more modern technologies being used, students are spending more time online exposing themselves to risks, including cyberbullying, cyber grooming, sexting, and more. This paper describes the results of a research to identify the difference between the number of university students who encountered risky behavior on the Internet before and during the Covid-19 pandemic. The research also focused on the time students spent online in connection with school and extracurricular activities before and during the Covid-19 pandemic. 114 randomly selected students of the Faculty of Education, Palacký University in the Czech Republic participated in this study. The findings revealed that students were significantly more likely to encounter risky behavior before the pandemic than during the pandemic. Students spent significantly more time on the Internet on school activities during the Covid-19 pandemic, whereas the time spent on the Internet while focusing on private activities decreased. Another interesting finding revealed that among the selected pre-pandemic risky behaviors, sexting among the age category of 22 stood out.

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1. Introduction

In the contemporary digitalized society, the protection of personal data and privacy, in general, should come first. Most of the population in the Czech Republic has access to the Internet, which was proven during the global Covid-19 pandemic. A large part of citizens was forced to transfer their work and personal lives to the online environment. Employers with such possibilities allowed their employees to work from home. Even meeting family and friends was not easy due to government restrictions. The cyber environment was often the only possible way to maintain social contacts, however, direct personal encounters can never be fully replaced. Women tended to communicate with family and friends via various platforms, while men tended to communicate through computer games (Nguyen et al., 2021).

The education of pupils and students also moved to the Internet. At the beginning of the pandemic, it was expected that it would only be for a while, however, the hopes resulted into several months of teaching online with the use of various platforms. In a short time, all participants had to learn how to work with the platforms, which was not always easy. In this difficult time, the differences between the digital competencies of students and teachers became evident. Another big challenge was the need to provide the necessary technologies, technical equipment, and a quality internet connection (Priyadarshani & Jesuiya, 2021). Students not only learned to work with new platforms, but also needed the motivation to complete tasks. The advantage of the home environment and time flexibility is one of the main arguments supporting online teaching. Those students, who saw this way of teaching as an opportunity to achieve their goals towards their future careers, considered distance learning to be more beneficial than students without motivation (Lin, 2021).

The issue of risky behavior in the online environment is not limited to the period of the global Covid-19 pandemic but dates long before. The dynamic development of digital technologies and still more available connection to the Internet gives aggressors more space to attack potential victims. Students of the Faculty of Education should be thoroughly acquainted with this issue, so that they are able to protect not only themselves but also to adequately respond while teaching their future students, such as the high school ones. Differences in the approach towards risky behavior are related to the type of schools the students attend, but no significant differences were discovered in the time spent online (Duranovic, 2016).

2. Problem Statement

2.1. Safety in an online environment

Today, university students can no longer do without an Internet connection. They use a variety of platforms to communicate, share documents, and access school or library learning materials. In private, it is important for them to communicate with classmates, friends or share personal life experiences on social networks. However, they are often unaware of the consequences of their online behavior (Méndez et al., 2019) and can endanger not only themselves but also their friends or the institution they attend.

Bhatnagar and Pry (2020) focused on the safety of the online environment for university students. In their research, they asked students if they had encountered any risky phenomenon. They found out that 93% of respondents have an account on social networks with 74.76% having more than one account. The

age range was between 18 to 45 years. Interestingly, 72.6% of respondents understand the importance of protecting their accounts against misuse. Surprisingly, only 30 students out of a total of 107 encountered risky behavior, but only in 6.67% of cases, there was a link to the risk of social networks, in other cases, it was a technical risk. Finally, 80% of the students surveyed agreed that the university should include a precautionary program on the risks in the online environment, preferably in the first year of study. However, university students are not the only ones endangered by this, even much younger children are at risk here. They should receive information on safety on the Internet as soon as possible so that they have their social media and cyberspace in general under control (Tosun et al., 2020).

In a somewhat different way, Yan et al. (2018) conducted their study of judgment assessment of college students in the field of cyber security. The authors did not use a standard questionnaire, but a questionnaire with 16 different cyber security scenarios, and the participants assessed the degree of risk. The extent to which students can make the right judgment about the risks of cyberspace was assessed. The study involved 462 university students. Of the 16 scenarios, none reached more than 90% of the correct assessment rate. The worst-case scenario was a simulation of the loss of personal data by a federal government official, which did not reach even a 50% level of correct assessment. Of the total number of students, 73% of respondents reached an average cyber risk assessment rate, and only 4% of respondents can be classified as a group with high judgment.

Raineri and Fudge (2019) focused on business students at universities and private colleges in the United States. 78% of respondents said they use strong passwords. It turned out that a bigger problem is the lack of information about computer viruses. Some students (22%), learned about this issue at school, others (43%), through self-study, but 29% of respondents have little knowledge. When it came to cyber security, 45% of students said they had learned about it at school. Employers prefer new employees with a good orientation in the area of risks in the online environment in order to minimize the possibility of damage and inappropriate behavior of their employees. Universities should prepare all their students well enough so that they can compete in the labor market later. Alluhaidan and Abu-taieh (2020), who dealt with methods of evaluating students' cyber security knowledge, emphasized the need for regular testing of knowledge in order to consolidate it. Kam & Katerattanakul, 2019 and Frydenberg & Lorenz, 2020 also point to the possibilities of further education in cyber security, which can bring people closer to their career goals. Payne et al. (2021) also presented an interdisciplinary course on this topic, which can be completed by students of various educational disciplines.

2.2. Risky behavior

Risky behavior can be viewed from different angles. One is the division of the people involved into attackers, bystanders, or victims. Furthermore, in the school environment, it can be understood as a violation of security by personal data theft or misuse or hacking into the school system which includes grades and teachers' notes. Cyberbullying, cyber grooming, or sexting can also be considered risky (Richardson et al., 2020).

Cyberbullying, as one of the forms of risky behavior, can fundamentally affect students' lives. Several studies suggest that cyberbullying doesn't stay out of the university environment either. Macdonald and Roberts-Pittman (2010) state that 21.9% of university students were bullied and 8.6% of them bullied

someone. No gender-based differences were discovered in this context. Similar results were reached by Martínez-monteagudo et al. (2019). Their results suggest that 18.6% of respondents were victims of cyberbullying via social networks or e-mail. A link between a suitable home environment and cyberbullying was also discovered, with the results showing that students with a sufficiently motivating family background tend to be more resistant to online attacks. Victims of cyberbullying also quite often encounter negative effects on their studies, which in many cases leads to dropping out of school (Makori & Agufana, 2020; Myers & Cowie, 2017)

Cyber grooming is most often committed against younger victims who cannot defend themselves. However, this does not preclude the abuse of adults and the elderly. Wachs et al. (2016) compared the experience of cyber grooming in adolescent groups aged 11 to 19 across different countries. The worst situation was in Thailand, where 36.5% of respondents encountered this phenomenon. Compared to other countries, there was no statistically significant difference between girls and boys in Asian countries. In the USA, the incidence of cyber grooming was confirmed by 12.6% of respondents, and, for example, in the Netherlands, it was 7.4%. In these countries and Germany, a significant difference was found between the proportion of girls (14.0%) and boys (6.1%).

Another manifestation of risky behavior is sending intimate photos and videos or sexting. This behavior is a very serious problem for under-aged adolescents (under 18 years of age) protected by the law. Graham Holmes et al., (2020) present interesting findings from the USA. 1265 respondents participated in their study. 50.1% said they had ever sent an intimate photo or video to somebody, while 65.5% had received a photo with a sexual theme before. Senders most often send such photos to their partners or as a part of a sexually motivated request. It was noteworthy that more than half of the respondents have had a positive experience with sexting and many of them haven't ruled out further repetition. Only 17% reported a negative experience.

3. Research Questions

The global Covid-19 pandemic relocated teaching in all schools to the online environment. There were differences in digital literacy among both pupils and teachers, as well as their willingness and flexibility to switch to distance learning (Frolova et al., 2021). Among other things, the students mentioned the importance of a teacher's personal charisma in order to enjoy online teaching and draw enough benefits from the time spent on the Internet.

The main question of the research was whether the students encountered some form of risky behavior on the Internet before and during the Covid-19 pandemic. Another research question was how the ratio of time spent on the Internet in connection with school and extracurricular activities changed. The last question was whether the frequency of risky behavior changes according to the age of the students (or their age category).

4. Purpose of the Study

The purpose of the study was to identify which negative online phenomena were encountered by university students before and during the Covid-19 pandemic. The study serves as a preliminary research

for the planned larger research. Mapping the relationship between time spent on the Internet and risky behavior that students have encountered can provide important information about the adequacy of precautionary programs in this area. Based on the literature research, (Hamuddin et al., 2020; Richardson et al., 2020), we formed the following hypotheses:

H1: University students encountered risky behavior more often during the Covid-19 pandemic than before the pandemic.

H2: Time spent on the Internet linked to school activities increased for university students during the Covid-19 pandemic compared to before the pandemic.

5. Research Methods

As the main research method, we used a questionnaire. Before conducting the research, a pilot research was conducted in the form of a structured interview with six students. Based on these interviews, a separate two-part questionnaire was subsequently compiled, focusing on the period before the pandemic and the period during the Covid-19 pandemic. Students were asked how much time they spent on the Internet on school-related activities and how much time they spent on entertainment activities in both periods. We were also trying to find out whether the students encountered the previously listed forms of risky behavior and we also focused on selected demographic data.

The research sample for the preliminary research consisted of randomly selected students of various fields of study of the Faculty of Education of Palacký University in Olomouc. There were 114 students, of which 94 (82.46%) were women and 20 (17.54%) were men. Full-time and part-time students in the age range of 19 to 58 years participated in the research. Respondents were divided into three categories according to age. The first category included students up to and including 22 years of age. The second category included respondents between 23 and 30 years of age, and the third category included students over 30 years of age. The first age group consisted of the most respondents, specifically 22.8%.

Basic statistic methods were used to analyze the data obtained from the questionnaire, and due to the nature of the data obtained (nominal data), the chi-squared test of independence was used to prove the established hypotheses. Statistical calculations were performed in the environment of the statistical package STATISTICA 13.

6. Findings

The main research question was whether university students encountered risky behavior more often during the pandemic or before the Covid-19 pandemic. We further selected cyberbullying, cyber grooming, and sexting. We compared these forms of risky behavior of students in selected age categories in the period before the pandemic and during the Covid-19 pandemic. Finally, we were interested in how the ratio of time spent on the Internet in connection with school activities during the pandemic and before the pandemic changed.

6.1. Risky behavior of students before and during the Covid-19 pandemic

From the answers (see Figure 1) it follows that university students encountered risky behavior statistically significantly more often before the Covid-19 pandemic than during the pandemic. 101 (44.3%) respondents said they encountered such behavior before the pandemic and 90 (39.47%) respondents said they encountered such behavior during the pandemic. The results were compared using the chi-square significance test, the significance level $p = 0.05$ was chosen. Hypothesis H1 has not been proven.

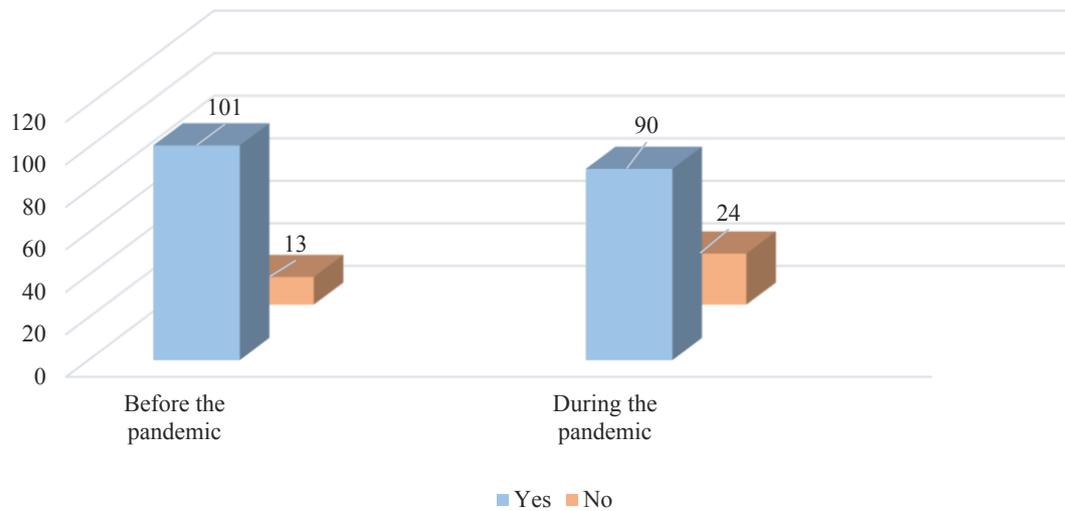


Figure 1. Encounter with risky behavior before and during the Covid-19 pandemic

6.2. Students' experience with cyberbullying before the Covid-19 pandemic and during the pandemic

In the frequency of encounters with cyberbullying before the Covid-19 pandemic and during the pandemic, a statistically significant difference was found in students at a significance level of 0.002. Students reported a significantly lower incidence of the phenomenon during the Covid-19 pandemic. Out of the total number of 114 respondents, 19 respondents (8.33%) encountered cyberbullying before the pandemic, of which 13 were women and 6 were men. During the Covid-19 pandemic, there were 4 respondents (1.75%), 3 women and one man, with such an experience. Table 1 shows that most respondents (a total of 12 students) who encountered cyberbullying were under the age of 22.

Table 1. Cyberbullying

Cyberbullying	Before the pandemic		During the pandemic	
	Yes	No	Yes	No
up to 22 years	12	48	2	58
23-30 years	6	27	1	32
over 30 years	1	20	1	20

6.3. Students' experience with cyber grooming before the Covid-19 pandemic and during the pandemic

There was no statistically significant difference ($p = 0.14$) in the frequency of encounters with cyber grooming before the Covid-19 pandemic and during the pandemic. Before the Covid-19 pandemic, 9 respondents, 8 women and 1 man (3.95%), encountered cyber grooming, whereas there were only 3 respondents (1.316%), 3 women and no man, who experienced it during the pandemic.

Table 2. Cyber grooming

Cyber grooming	Before the pandemic		During the pandemic	
	Yes	No	Yes	No
up to 22 years	5	55	2	58
23-30 years	4	29	1	32
over 30 years	0	21	0	21

6.4. Students' experience with sexting before the Covid-19 pandemic and during the pandemic

In the question of the frequency of students' encounters with sexting before the Covid-19 pandemic and during the Covid-19 pandemic, a statistically significant difference in the significance level of 0.003 was found. During the Covid-19 pandemic, students reported a significantly lower incidence of the phenomenon. Before the Covid-19 pandemic, 40 (17.54%) respondents encountered sexting, which is 36 (19.15%) women and 4 (10%) men, and 19 (8.22%) respondents, out of which 3 (6.92%) were women and 6 (15%) were men, experienced this phenomenon during the pandemic.

Table 3. Sexting

Sexting	Before the pandemic		During the pandemic	
	Yes	No	Yes	No
up to 22 years	23	37	15	45
23 - 30 years	15	18	3	30
Over 30 years	2	19	1	20

6.5. Time spent online performing both extracurricular and school activities during the pandemic and before the pandemic

In line with expectations (see hypothesis 2), the time spent on the Internet in connection with school activities has increased during the pandemic. The most significant difference was in the category of more than 5 hours, when the number of respondents increased from 17 (14.91%) to 45 (39.45%), see Figure 2. Before the Covid-19 pandemic, university students would most often (31 (27.19%) of respondents) spend 1-2 hours online performing school activities.

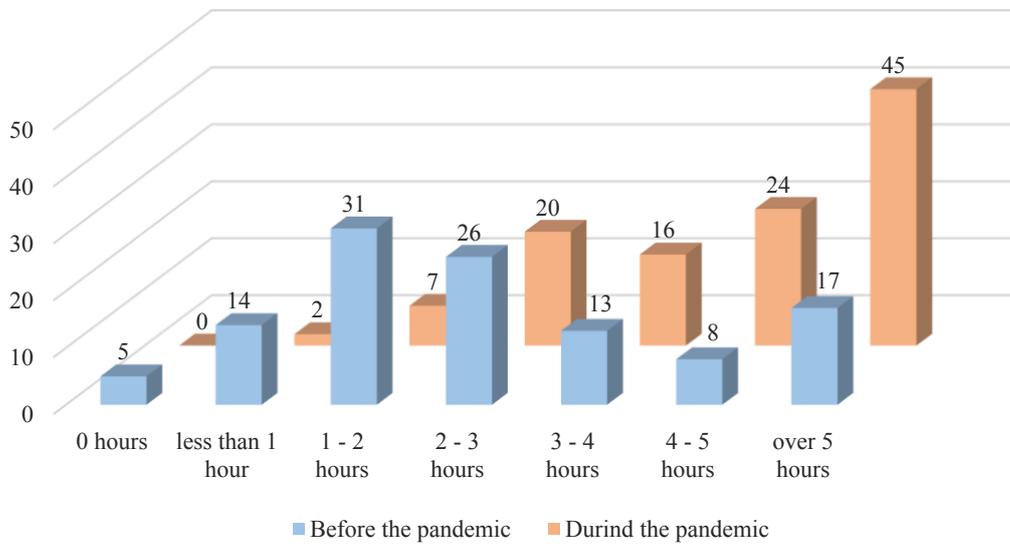


Figure 2. Time spent online performing school activities before and during the Covid-19 pandemic

In connection with extracurricular activities, there was a decrease in the time spent online, see Figure 3. There was no statistically significant difference ($p = 0.57$) between students' time spent on the Internet performing extracurricular activities in the frequencies of individual time categories before the pandemic and during the Covid-19 pandemic.

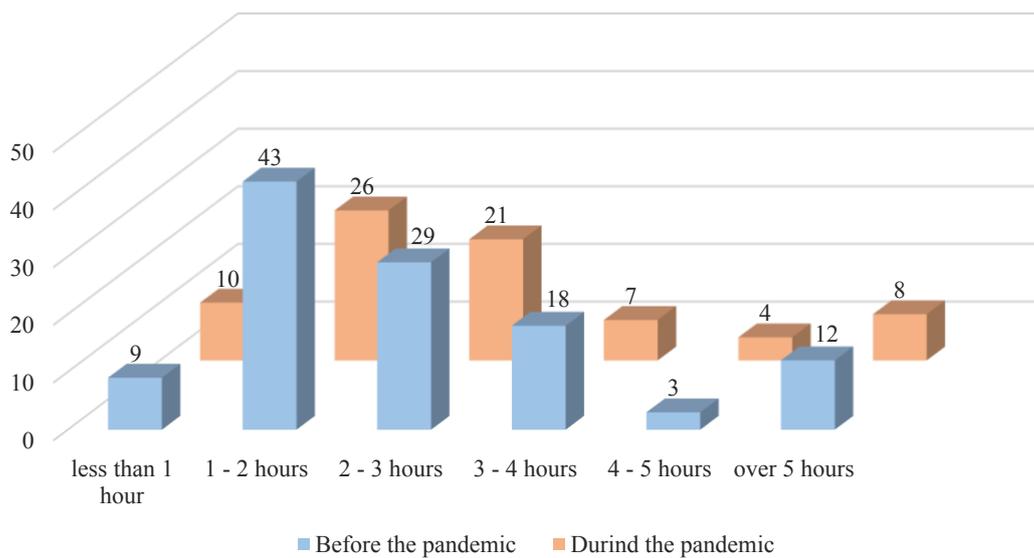


Figure 3. Time spent online performing extracurricular activities before and during the Covid-19 pandemic

7. Conclusion

Based on the research, it was found that although, according to theoretical knowledge, it was expected that during the Covid-19 pandemic, university students would be more likely to encounter risky behavior than before the pandemic, this was not the case. The results of the research did not confirm the H1 hypothesis, on the contrary, during the pandemic, the frequency of risky contacts of students reduced. As expected, during the pandemic, the time spent online performing school activities increased, hypothesis H2 was thus confirmed. At the same time, it also meant a decrease in the time students spent on the Internet performing extracurricular activities. Therefore, a connection might be assumed between the shorter time spent on the Internet for private purposes and the lower incidence of risky behavior on the Internet. Given that this study serves as a preliminary research, we want to verify this assumption in our future research. Furthermore, it was found that the gender of the respondents didn't affect the time spent on the Internet (both before and during the Covid-19 pandemic) whether it is for teaching or private matters.

We also discovered that the incidence of selected forms of risky behavior such as cyberbullying, cyber grooming, and sexting decreased during the Covid-19 pandemic compared to the pre-pandemic period. Selected risky behavior was also compared in groups according to age categories, as shown in Tables 1, 2, 3. Students were most often at risk of sexting before the pandemic, 40 (17.54%) students reported encounters with this phenomenon (interestingly, the frequency of sexting was not significantly different for either men or women, both before and during the Covid-19 pandemic). The least frequent risky phenomenon noted before the pandemic was cyber grooming, which endangered 9 (3.95%) respondents. It is also evident that students under the age of 22 are the most endangered ones.

The results obtained will be used as a base for the planned larger study. The subjective view of the respondents, given by the research method (questionnaire) and the limited research sample of respondents from only one university, as well as the unified study focus of students, might be considered a certain limitation of the research validity.

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